RELIGION, CULTURE, AND ECONOMIC PERFORMANCE

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Abstract

The hypothesis that the coefficients on variables of religious affiliation are jointly equal to zero can frequently be rejected at conventional levels of statistical significance (i.e., religion matters), but no robust relationship between adherence to major world religions and national economic performance is uncovered, using both cross-national and subnational data. The results with respect to Islam do not support the notion that it is inimical to growth. On the contrary, virtually every statistically significant coefficient on Muslim population shares reported in this paper—in both cross-country and within-country statistical analyses—is positive. If anything, Islam promotes growth.

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INTRODUCTION

Abundant evidence affirms that religious belief affects a wide range of behavioral outcomes (Iannaccone 1998), and religious activity can affect economic performance at the level of the individual, group, or nation through at least two channels. In *Wealth of Nations*, Adam Smith argued that participation in religious sects could potentially convey two economic advantages to adherents (Anderson 1988).[1] The first could be as a reputational signal: while the poor might look alike to potential employers, lenders, and customers, membership in a "good" sect could convey a reduction in risk associated with the particular individual and ultimately improve the efficient allocation of resources.[2] Second, sects could also provide for extra-legal means of establishing trust and sanctioning miscreants in intragroup transactions, again reducing uncertainty and improving efficiency, especially where civil remedies for failure to uphold contracts were weak.[3] This interpretation is essentially contentless with respect to the actual nature of religious belief. Indeed, there is nothing necessarily unique about religious sects in this regard--the argument could apply to a wide range of voluntary associations or clubs.

A variant of this notion offered by modernization theorists such as Hoselitz (1960), McClelland (1961), and Hagen (1962) is that traditional societies resist change, and innovative groups can be important in the process of modernization. Hoselitz, in particular, argued that socially marginalized groups might seize on economic enrichment as a mechanism for securing prosperity and security. Religious affiliation could serve as the base for group cohesion necessary to successfully challenge established institutions and practices. For example, according to Lal (1998), Buddhism and Jainism played just this sort of role in ancient India.

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[1] Following Iannaccone (1998), the term religion is used to mean any shared set of beliefs, activities, and institutions premised upon faith in supernatural forces. Max Weber (1906/2002) further distinguishes between churches, for instance Catholic or Lutheran, which are inclusive, voluntary organizations, characterized by formal hierarchical administration, that minister to all—damned and saved alike—who happen to fall under their administration, typically due to birth, and where possible seek to have their authority reinforced by association with the state. In contrast, sects—and here he includes American Baptists, Quakers, Presbyterians, and other groups descending from Puritanism—are defined as exclusive, voluntary communities of the religiously qualified, governed by a network of peers, whose principal political demand is freedom from the state.

[2] In *'Churches' and 'Sects' in North America* (1906/2002), Weber provides particularly vivid first-hand accounts of both of these effects in operation in turn-of-the-century America. In other settings, Weber (1920/1952, 1920/1958), Lewis (1955), McClelland (1961), Hagen (1962), and Bellah (1963) make reference to Jews, Huguenots, Quakers, Jains, and Parsees among others. Kennedy (1988) and Platteau (1994) provide numerous contemporary examples from sub-Saharan Africa. Sacerdote and Glaeser (2001) argue that networks increase returns to educational investments, and this networking effect could further reinforce the economic impact of sect membership.

[3] Fafchamps (2002) provides a dissenting view, arguing that there is no empirical evidence to support the collective sanction hypothesis.

Yet history is also littered with close-knit minority groups that did not prosper. McClelland (1961), for example, observes that Gypsies or Roma were subject to similar discrimination as Jews in Europe but did not counter-strive by prospering in business. Institutions are endogenous and presumably arise out of shared values and the constraints imposed by the external environment. In a second line of argumentation, most prominently associated with Max Weber, it is the content of religious belief that is essential.[4] In *The Protestant Ethic and the 'Spirit' of Capitalism,* Weber (1905/2002) contended that the Protestant Reformation was critical to the rise of capitalism through its impact on belief systems. The starting point of Weber's analysis was "the ethical discrepancy between religious values and the given world" (Yang 1964). From this, religions could be classified according to their acceptance or rejection of the world; if acceptance, the presence or absence of tension toward the world and whether they fostered an orientation of transformation, adaptation, or escape from the given world.

Weber argued that the Calvinist doctrine of predestination and the associated notion of the "calling" were essential for transforming attitudes toward economic activity and wealth accumulation.[5] In John Calvin's view, individuals were predestined to salvation or damnation, and "good works" were a means of self-assurance and demonstration to others of one's fate. Each had a "calling," and the successful completion of this religious mission on a daily basis was pleasing to God and a mark of His blessing. In contrast to Catholicism's glorification of monasticism, this conception projected economic activity into the center of religious life and replaced the Catholic cycle of sin, repentance, atonement, and release, followed by more sin, with a cumulative notion of moral life. The result was a "this-worldly asceticism," which focused adherents on diligent, efficient economic activity, thrift, and non-ostentatious accumulation of wealth, which he saw as the bedrock of modern capitalism. This development was not predetermined—Weber was explicit that the development of ideas and institutions congenial to capitalism was endogenous, path-dependent, and not determined by any iron laws of history.[6]

Such an extraordinary thesis was sure to attract critics, and it did. Weber stands accused of mischaracterizing Protestant theology, misinterpreting Catholicism, ignoring nonreligious

[4] See also Fanfani (1935/1984).

[5] Weber sees John Calvin, George Fox, John Wesley, and other radical dissenters, not Martin Luther, as the true sources of the Protestant Reformation. He went so far as to posit in the theological doctrines the affinities of different sects to different occupations (i.e., Calvinists make good entrepreneurs; Pietists good clerks). Ekelund, Hébert, and Tollison (2002) essentially turn Weber's story on its head arguing that the underlying economics of Western Europe and the behavior of the Catholic Church in effect created market space for new entrants to whom individuals rationally switched allegiances.

[6] Eisenstadt (1968) subsequently proposed a weaker version of the thesis—that it was not the specific theology per se but rather the "transformative potential" of religion that could account for wholesale alterations in values, behaviors, and outcomes.

sources of intellectual ferment, misunderstanding the economic antecedents of industrial capitalism, thoroughly confusing the historical record with respect to the rise of capitalism in Catholic and Protestant communities in Western Europe, and even mishandling the statistical data he had at his disposal.[7] It is fair to say that today no one (with the possible exception of Landes [1998]) accepts Weber's thesis at face value. Blum and Dudley (2001) provide the most sophisticated version of the Weber thesis, arguing that the Calvinist doctrine of predestination (in contradistinction to the Catholic practice of ritual penance), in game-theoretic terms, increased the cost of contractual defection (i.e., breaking contracts was a bigger deal for Protestants). This Protestant reluctance to break contracts contributed to greater trust and willingness to honor contracts with strangers and thereby contributed to the spread of more extensive information networks in the Protestant lands of Northern Europe, and it was these network externalities that promoted growth and the rise of industrial capitalism.

These two lines of reasoning—religion as a club and as a molder of behavior—merge in a fascinating paper by Greif (1994) who analyzes the 11th century competition between Maghribi traders (North African Jewish traders who had adopted the values of Muslim society) and the Genoese merchants.

Greif demonstrates that the Maghribi displayed the reputational and intragroup cohesion associated with religious sects. The Genoese cultural innovations included formal contracts, courts to provide for their enforcement, the family firm (as distinct from an individual trader), and ultimately the joint stock company and associated accounting innovations. These organizational innovations were more efficient than the Maghribi methods, and as technological and political changes expanded the geographic scope of markets beyond the Mediterranean, the Genoese captured these new opportunities. Eventually the Maghribi disappeared as a distinct community, being absorbed into the existing Egyptian Jewish community.

Greif asserts that the contrast between the cultural innovation of the Genoese on the one hand and the unwillingness or inability of the Maghribi to adapt on the other stemmed from cultural differences between the Genoese individualist society of the Latinate and the Maghribi communalist or collectivist society of the Muslim world.[8] He then goes on to associate the

[7] See Tawney (1926/1964), Samuelsson (1961), Eisenstadt (1968), Giddens (1976), Furnham (1990), Kaufmann (1997), and Iannaccone (1998). The argument by Greif (1994) outlined below and supporting evidence from Kaufmann (1997) suggest that fundamental economic and social innovations were occurring in Europe centuries before the Reformation. Lal (1998) reaches the same conclusion through a different route, emphasizing changes in family law under Pope Gregory I and the establishment of modern legal institutions under Pope Gregory VII.

[8] Greif (1994) and others use the term "collectivist" to describe societies characterized by a social order in which individuals typically interact socially and economically with other members of a common affinity

individualistic Genoese with today's successful developed countries and the communalist Maghribi with today's less successful developing countries.[9] This argument just pushes the question back one step further: From where did these differing belief systems originate?

Until recently, economists have paid little attention to this issue; future Nobel Laureate W. Arthur Lewis, one of the few who did, expressed skepticism that religious beliefs had any significant impact on economic behavior and indeed argued that the causality probably ran the other direction: Despite religion's claim to be the ultimate primal, changes in economic circumstances spurred theological adaptation (Lewis 1955). In this regard, Lewis, in asserting the primacy of economics over religion, followed the common practice of elevating one's own scholastic specialty to the primal; Hofstede, a sociologist, wrote "Religious affiliation by itself is less culturally relevant than is often assumed if we trace the religious histories of countries, then the religion a population has embraced along with the version of that religion seem to have been a *result* of previously existing cultural value patterns as much as a *cause* of cultural differences" (Hofstede 1997, 16; emphasis in the original). This conundrum—how to sort out the pattern of causality among economics, culture, and religious belief—is a central challenge.

This paper is an attempt to empirically analyze the second line of argumentation, recognizing per Greif that intermediating institutions may be the mechanism through which religious belief affects economic performance at the aggregate level. The paper first reviews the line of reasoning initiated by Weber that the specific content of religious beliefs may profoundly affect economic behavior. It then examines efforts undertaken primarily by psychologists and sociologists to quantitatively score national cultural tendencies. In the fourth section, data on religious affiliation, national culture, and economic performance are analyzed at the cross-national level. Since considerable recent commentary has focused on the alleged impact of Islam, specifically on economic performance, this issue is addressed in the fifth section, both cross-

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group, with social and economic interactions governed by ascriptive norms subject to enforcement through intragroup sanctions; relations with members of out-groups are circumscribed and noncooperative. Group cohesion is highly valued. As Kuran (1997) observes, these social relations might better be described as "communalist" with the term "collectivist" reserved for moralities that assign an important role to the state. The social structure of "individualist" societies is characterized by extensive interaction among members of different groups, with individuals identifying with, and switching among, multiple groups. Economic interaction is governed by formal contracts enforceable through specialized organizations. Self-reliance is highly valued. See also Triandis (1995) and Hofstede (1997, 2001).

[9] Kennedy's description of the practices of Hausa merchants in West Africa is remarkably similar to Greif's depiction of the Maghribi. Likewise, after documenting their remarkable intermediation of trade throughout West Africa, Kennedy observes "of course, it is possible that these very systems of customary support which have underpinned contractual relations so successfully may increasingly inhibit the emergence of more advanced types of business behavior in the future" (Kennedy 1988, 146).

nationally and at the subnational level, using data from three multi-religious, multi-ethnic countries—India, Malaysia, and Ghana—located in three different areas of the world.

To preview the conclusions elaborated in the final section of the paper, the sociological and psychological analyses of the impact of religion on economic performance are indeterminate. Empirically, variables used to quantify national cultures are correlated with measures of religious affiliation and/or intensity of belief (i.e., they measure something), though they have no predictive power with respect to national economic performance.

In contrast, in regressions on economic performance, the hypothesis that the coefficients on variables of religious affiliation are jointly equal to zero can frequently be rejected at conventional levels of statistical significance (i.e., religion matters), but like Barro and McCleary (2002), no robust relationship between adherence to major world religions and national economic performance is uncovered. Perhaps it should not be surprising that something as durable as religious affiliation is only a weak explanator of something as variable as macroeconomic performance.

The economic performance of predominately Muslim countries is unremarkable once conventional economic fundamentals are taken into account, and the statistical modeling does not support the notion that Islam is inimical to growth. On the contrary, with one exception, every statistically significant coefficient on Muslim population shares reported in this paper—in both cross-country and within-country statistical analyses—is positive. If anything, Islam promotes growth.

RELIGION AND ECONOMIC PERFORMANCE

Weber completed works on Hinduism, Buddhism, and Confucianism; his essays on ancient Judaism were largely complete at the time of his death in 1920; work on Islam was planned but not completed. Weber worked from the particular (the rise of capitalism in Europe) to the general, and this intellectual trajectory informed his views of the non-Christian world. Since the rise of capitalism was not historically given, the obvious issue for Weber to explain was why it first developed among Protestants in Europe and North America.

Weber himself was a Protestant and was writing from a Germany that included three main religious groups: Lutherans, Catholics, and Jews. His topic was the rise of industrial capitalism that occurred initially in Britain, continental Europe, and North America—not its adoption in other regions. Yet, three aspects of Weber's argument—namely that ascetic Puritans were the vanguard of a material revolution, that many other religions besides Protestant sects preach asceticism, and that Protestant nonconformists were not the only religious minority in

Europe and North America—provide a link to a broader consideration of theology, institutions, and economic performance.

With regard to Judaism, theologically the most closely linked to Protestantism among the major non-Christian religions, Weber ascribed the economic success of Western European Jewry as a particular historical phenomenon derived from their status as a "pariah"—or in the less value-laden phrase of Park (1950), "marginal"—minority group along the lines first articulated by Adam Smith. While Judaism promoted rationality and mastery of the world, in contrast to radical Protestantism, economic success could not be interpreted as a signal of piety, which in Judaism was demonstrated through other means. Weber substantiates his argument by observing that Southern and Eastern Europe and the "Orient," where the Jewish presence was the largest and longest, failed to develop modern capitalism (Weber 1920/1952).

Confucianism, in Weber's view, was "this-worldly," but its promotion of harmonious relations along prescribed patterns was antithetical to the "creative destruction" of capitalism, to use Schumpeter's later-used phrase, and its codification of ethical rather than formal legal procedure inhibited the development of capitalist commercial relations.[10] In Weber's words, "Confucian rationalism meant rational adjustment to the world; Puritan rationalism meant rational mastery of the world" (Weber 1920/1964, 248). While a Puritan could live "'in' the world and not be part 'of' it," the Confucian ideal was to live "in" the world as a well-adjusted part of it (Weber 1920/1964, 248).[11] Of course, Confucius made a great comeback in the "Asian values" debate, albeit with a long lag (cf. Kahn 1979).[12]

Weber argued that while Hinduism and Buddhism promoted asceticism, it was an "other-worldly" or "world-rejecting" asceticism that upheld escape from, not mastery over, the material world. [13] The emphasis on ritual law in Hinduism acted as an impediment to technical or social innovation from within and even hampered local adaptations of foreign innovations, and Weber

[10] Some contemporary research into the impact of legal traditions on financial development and growth could be interpreted as providing support to Weber's contention (Mahoney 2001; Beck, Demirguc-Kunt, and Levine 2002).

[11] Weber argued that Taoism, the leading heterodoxy in China, could not play an "oppositionist" role to the dominant Confucian orthodoxy, analogous to radical Protestantism, because its "other-worldly" mysticism, toleration of magic, and encouragement of inaction, made it uniquely unsuited to spur the kind of rationalist revolution that occurred in Europe. Weber ascribes the failure of China to develop rational institutions beyond the "fetters of the kinship group" to the absence of a universalist ethical religion such as the Abrahamic religions of Judaism, Christianity, and Islam (Weber 1920/1964, 237).

[12] Hofstede and Bond (1988) scored cross-national survey data for a "Confucian dynamism" or long-term orientation scale. The variable is statistically significantly correlated with growth during the period 1965–85. Lal (1998) ascribes this to Sinic family structures. This will be taken up further in the next section.

[13] As in the case of the other religions, the discussion presumes that there is enough of an essential belief system in Hinduism to usefully discuss Hindu values shaping social behavior. Morris (1967) persuasively argues that there is not, particularly in past history, when the precolonial subcontinent was characterized by a high degree of political and economic fragmentation.

went so far as to argue that Hinduism's assimilative powers were so great that they negatively impacted even non-Hindu regions of South Asia (Weber 1920/1958).[14]

Subsequent commentators have developed a more nuanced analysis noting the absence of a single canonical text and the existence of scriptural writings reflecting disparate attitudes toward economic activity and the divergence between written texts and actual practices (cf. Pieris 1963, Uppal 1986). Eisenstadt argues that the uniqueness of Hinduism (especially in contrast to Islam) is that it has maintained its "identity without being tied to a given political framework"—presumably an asset in the process of modernization (Eisenstadt 1968, 32).[15]

In Weber's writings that touched on Islam, he argues that the characteristic "prebendal feudalism," and "arbitrary bureaucratic patrimonialism" of the Abbasid, Mamluk, and Ottoman dynasties, impeded the development of rational, predictable, and evolving legal structures without which rational capitalism could not emerge (Turner 1974, 1996; Crone 1999; Schluchter 1999). Weber continually contrasts the political and legal institutions existent in the Muslim world to their contemporary counterpart institutions of feudal Europe that guaranteed property rights. It was primarily this socio-political impediment, not any theological encumbrance, that inhibited the rise of capitalism.

Yet at the level of the individual psyche, Weber also subscribed to the notion that a warrior-ethic that emphasized pillage as a means of acquisition was incompatible with the "spirit of capitalism," though numerous commentators have observed that Weber was misguided in purely factual terms (cf. Turner 1974, Kuran 1997, Lapidus 1999, Levtzion 1999). Neither did Islam encourage counter-striving behavior in areas where Muslims were a minority (such as South Asia) nor did dissenting movements within Islam play a similar role to Calvinism in encouraging rational mastery of the world.[16] Yet, as Gellner argued, "by various obvious criteria—universalism, scripturalism, spiritual egalitarianism, the extension of full participation of the sacred community not to one, or some, but to *all*, and the rationalization of social life—Islam

[14] However, he compared the economically successful Jains and Parsees to European Jewry in terms of social exclusion and argued that certain Jainist tenets strongly paralleled Quaker and Puritan views (Weber 1920/1952, 1958).

[15] Eisenstadt (1968, 34) argues that the subsequent failure of India to develop successfully reflects "the failure of Hinduism to develop motivational orientations and commitments to the undertaking and performance of new secular roles…It was easier, paradoxically enough, for minority Hindu groups―mainly abroad―to form such a linkage than it was within India herself."

[16] On the first point, see Weber (1920/1958), Lewis (1955), and Metcalf (1999). On the latter point, see Cook (1999), Metcalf (1999), and Peters (1999). Rodinson (1973) argues that there were precisely such dynamic minority sects within Islam, and that the writings of Muslim ethicists during the Middle Ages (i.e., prior to the rise of capitalism in Europe) reveal a greater affinity toward economic advance than did those of their Christian counterparts. Geertz (1956, 1968) and Hagen (1962) describe the role of economically modernizing Muslim sects in modern Indonesia.

is, of the three great Western monotheisms, the one closest to modernity" (Gellner, 1981, 7; emphasis in the original).

Weber appealed to various kinds of historical data to substantiate his case, for example, by using surveys showing the religious affiliations of individuals involved in certain kinds of occupations. In light of the limitations of the available statistical materials and contemporary methods of statistical analysis, Weber's case was essentially historical-descriptive in nature.

MEASURING CULTURE

Advances in research methodologies in the first quarter-century after the Second World War allowed modernization theorists to apply more rigorous analysis and more extensive data to the broader topic of why economic performance has differed widely across societies more generally.[17] These researchers regarded economic development as one facet of a systematic process of modernization that among other things would result in a diminution of religion institutions, practices, and consciousness per the so-called secularization thesis (cf. Berger 1967, Martin 1978), which, ironically, its most prominent proponents would later repudiate (cf. Berger 1999, Martin 1999).[18] Although much of this work is now regarded as crude, ethnocentric, and passé, it nevertheless addressed important issues and may still be of value.

Prominent in this literature was research conducted mostly by psychologists and sociologists reported in McClelland (1961) who sought to measure "need for achievement," understand its determinants, and establish what links, if any, there were to economic performance.[19] What they were trying to measure was "the desire to do something better, faster, more efficiently, with less effort…It is a very specific, rather rare, drive which focuses on the goal of efficiency and which expresses itself in activities available in the culture which permit or encourage one to be more efficient; and across cultures the most common form such activity

[17] Weber did not use the term "modernization," which is of relatively recent vintage, and subsequent research by the modernization theorists was arguably more influenced by the thinking of his contemporary Emile Durkheim, and later, Talcott Parsons. See Adelman and Morris (1971) for a good survey of this literature; also Hoselitz (1960) and Hagen (1962).

[18] "A whole body of literature by historians and social scientists loosely labeled "secularization theory" is essentially mistaken…[the] idea is simple: Modernization necessarily leads to a decline of religion, both in society and in the minds of individuals. And it is precisely this key idea that has turned out to be wrong" (Berger 1999, 2-3). Berger (1999, 2) graciously adds, "As I like to tell my students, one advantage of being a social scientist, as against being, say, a philosopher or a theologian, is that you can have as much fun when your theories are falsified as when they are verified!" Gellner (1992) argues that the secularization thesis is essentially correct with respect to the world's major religious traditions—with the sole exception of Islam.

[19] See Furnham (1990) for a survey of other attempts to psychometric assessments of Protestant work ethic beliefs.

takes is business" (McClelland 1976, A-B), similar to the notion of X-efficiency (Leibenstein 1966).[20]

Implicit in this conception is the notion that there are national cultures—sufficiently shared, territorially unique, and persistent or unchanging to be a useful analytical category—and that this set of shared values or behavioral tendencies can be scored numerically. Obviously, each of these characteristics is subject to challenge, particularly in regard to multi-ethnic states (McSweeney 2002). Nevertheless, this notion of national culture, need for achievement, and its measurement spawned a vast literature.[21] Researchers used various techniques to measure need for achievement, including controlled experiments on individual subjects in Brazil, Germany, India, Italy, Japan, Poland, Turkey, and the United States; analysis of the folktales of 45 preliterate societies for achievement imagery; and analysis of third- and fourth- grade school readers for a sample of 23 countries in 1925 and 41 countries in 1950.[22] There is little correlation between the 1925 and 1950 measures, which is a puzzle if national cultures exist in any meaningful sense, are persistent in character, and are being captured in these kinds of analyses.

McClelland reported modest support for Weber's hypothesis regarding the impact of Protestantism on the rise of capitalism with regard to differences among achievement orientation scores for contemporary Catholic and Protestant populations in North America.[23] Likewise, he obtained a positive statistical relationship between the national need-for-achievement scores obtained from the children's readers and subsequent changes in the production of electricity, which he took as a proxy for economic growth, though Hofstede (1997, 2001) observes that the relationship between need for achievement and per capita income growth did not hold for a later sample period.

More generally, McClelland found that among both the preliterate societies and contemporary groups, high need-for-achievement scores were associated with religious practices that stressed individual (as distinct from ritualistic) contact with the Divine and a de-emphasis on

[20] According to Hofstede, "In choosing the achievement motive, the American McClelland has promoted a typical Anglo value complex to a *universal* recipe for economic success. A Frenchman, Swede, or Japanese would have been unlikely to conceive of a worldwide achievement motive. Even the word 'achievement' is difficult to translate into other languages (Hofstede 1997, 124; emphasis in the original).

[21] Among the more curious applications was done by Bradburn and Burlew (1961), who used various types of literature to measure changes in achievement orientation over time in Tudor, England. Per Greif, McClelland also notes, in passing, that literature analysis suggests that the Genoese had a high achievement orientation. Intriguingly, Kennedy (1988) cites a study of Nigerian schoolchildren by LeVine (1966) in which the Hausa, which in certain respects are reminiscent of the Maghribi, ranked lowest on need to achieve among the three largest ethnic groups.

[22] See McClelland (1961) for details of the methods used in making these measurements.

[23] Rosen (1959) found that North American Jews were distinct in that they were the only group for which need-for-achievement scores did not decline with social class.

religious experts or authorities as a necessary adjunct to the performance of religious duties. He also reports sociological survey evidence that appears to confirm the casual empiricism of Weber and Lewis regarding Quakers and Jains: adherents to some of these religions (e.g., Quakers in the United States; Jains, Vaishnava Hindus, and Parsees in India; Zen Buddhists in Japan) are over-represented among the business elite. He had remarkably little to say about Islam.[24]

Cross-national surveys of individual respondents' cultural predilections were undertaken on a much grander scale as part of an IBM management program over the 1967–73 period (Hofstede 1997, 2001). Two rounds of survey questionnaires were administered to 88,000 IBM employees in 1967 and 1973. In addition to the demographic control questions, the surveys consisted of 60 "core" questions and 66 "recommended" questions; the surveys were conducted in 20 languages on IBM employees in 72 countries. Of these, 65 countries had enough respondents to warrant analysis at the national level. Subsequently, Hofstede constructed estimates for an additional 16 countries. These survey results have served as the springboard for a large—and controversial—social psychology literature.[25]

According to Hofstede, statistical analysis of the responses suggested that they could be characterized along four dimensions: a power-distance index ("the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is unequally distributed"); an uncertainty-avoidance index ("the extent to which the members of a culture feel threatened by uncertain or unknown situations"); an individualism-collectivism dimension ("individualism stands for a society in which the ties between individuals are loose…collectivism stands for a society in which people from birth onwards are integrated into strong, cohesive in-groups…"); and a masculine-feminine dimension ("masculinity stands for a society in which social gender roles are clearly distinct…femininity stands for a society in which social gender roles overlap: both men and women are supposed to be modest, tender, and concerned with the quality of life"). Hofstede argued that McClelland's need for achievement was strongly correlated with the combination of weak uncertainty avoidance and strong masculinity.

As a check on the possible cultural bias of the survey, a second survey was designed by Chinese social scientists and administered to groups of 100 students (half male, half female) in 23

[24] While McClelland had little to say about Islam, he did make another intriguing observation. Communism could be regarded as a ecclesiastical and formalistic religion, which would tend toward a collectivist mentality in social relations. However, the need-to-achieve score calculated from USSR children's readers in 1950 was very high, leading McClelland to predict a rise in individualistic attitudes in the USSR. At the same time, the Soviets were consciously disrupting traditional family life by encouraging female labor force participation, with the likely effect of further eroding traditional values. McClelland speculated that similar forces might be at work in China, though he had no data on need-to-achieve scores in the Chinese case.

[25] See Furnham (1990) for a judicious review.

countries. The results of the Chinese-designed survey were mapped to the four dimensions reported above, except that there was no counterpart to the uncertainty-avoidance index, and instead another response pattern cluster emerged that was labeled the long-term/short-term dimension—"the fostering of virtues oriented towards future rewards, in particular, perseverance and thrift; its opposite pole stands for the fostering of virtues related to past and present, in particular, respect for tradition, preservation of 'face' and fulfilling social obligations" (Hofstede 2001, 359).

Hofstede argued that culture precedes religion: religions that fit, not change, pre-existing values are adopted. Of the four cultural dimensions, uncertainty avoidance appears to be most meaningfully related to religion. The basic religio-cultural schism is between the revealed-truth monotheistic religions (Catholicism, Orthodox Christianity, Judaism, Islam) of high uncertainty-avoidance cultures and religions of the low uncertainty-avoidance cultures, including Hinduism and Buddhism, which tend to emphasize ritual and virtue over indisputable truth. Two exceptions stand out: Japan, which scores extremely high on uncertainty avoidance, and the Protestant-dominated societies that, exceptionally for people of the book, score low on uncertainty avoidance. Individualistic societies tend to promote religions that emphasize the individual's relationship with the supernatural; the Protestant-dominated societies score the highest on this indicator (and Japan the lowest of any developed country), perhaps explaining their exceptionality with respect to uncertainty avoidance and religion.

The other two cultural dimensions also map to religious predilections. High scores on power-distance (i.e., comfort and acceptance of hierarchy) tend to be associated with Catholicism relative to Protestantism, and Hinduism relative to Islam. Countries in the Confucian cultural zone score high on power-distance, though it is unclear which came first, hierarchical social relations or Confucius.

Additional insight is provided by the final cultural indicator, the masculinity measure, in that the cultures with high femininity scores have tended to secularize faster.[26] Verweij, Ester, and Nauta (1997), using the World Values Study data, found that Hofstede's masculinity index was statistically significantly correlated with both religiosity and orthodoxy of belief, and went some

[26] Hofstede argues that Christianity maintains a dialectic between traditionally masculine and feminine values, in its crudest form between the "an-eye-for-an-eye" of the Old Testament and the "turn the other cheek" of the New. Although one can identify exceptions within any broad religious tradition, Catholic traditions tend to support masculine values, while Protestant traditions support feminine ones. Similarly, Sunni Islam is a more triumphant, masculine version of Islam than Shia, which emphasizes suffering. Shia-dominated Iran scored lower on the masculine-feminine measure than the Sunni-dominated Arab countries. Within Buddhism, Japanese Zen Buddhism is a "tougher" variant than that practiced in Thailand. All of these observations could be interpreted as enhancing confidence in the statistical analysis, or as simple ex post rationalizations, thereof.

way in explaining "American exceptionalism" with respect to its coincidence of wealth, modernity, and a relatively high level of religious orientation.

What does this have to do with economic performance? Hofstede makes no claim that these cultural measures can directly explain economic performance, and indeed, they do not appear to be correlated with economic growth rates (Hofstede 2001, exhibit A6.5). To the extent that individualism is highly correlated with per capita income, Hofstede argues that it is more likely that the causality runs from income to individualism, not the reverse.[27]

However, Hofstede does claim that the long-term orientation indicator causes economic performance, for example, by raising the marginal propensity to save, though he admits that like McClelland's earlier result, this may be sample-period specific. In this respect, religions that emphasize virtue over truth, such as Hinduism, are associated with high long-term orientation scores and could be expected to promote growth. In contrast, Islam appears to be associated with very low long-term orientation that could be expected to hamper growth.[28] Nooderhaven and Tidjani (2001) report responses derived from a subsequent sampling of African students who might be expected to embody values transmitted from pre-Abrahamic religious traditions. They make the intriguing observation that survey questions that discriminated between knowledge, wisdom, and education, tended to elicit responses in African cultures expressing a preference for wisdom and experience over knowledge, reminiscent of Appiah's (1993) distinction between traditional and modern knowledge. These responses are negatively correlated with the share of savings in GDP, the marginal propensity to save, and GDP growth at the national level.

In summary, Hofstede generated a broader set of national cultural indicators. To a significant extent they appear to support the content of the interaction of religion and personal values first elaborated by Weber. Unlike Weber, McClelland, and others, Hofstede did not claim that these are likely to influence economic outcomes (with the exception of the long-term orientation measure he claimed affected economic performance at the national level).

This work is subject to the same questions as McClelland's regarding the meaningfulness of national culture as an analytic category. More specifically, even if national cultures existed, it

[27] Hofstede (2001) also predicts that demographic change in the form of aging societies will require the more efficient use of female labor and inducing declines in the masculine-feminine cultural dimension--and thus providing another example of economic change inducing cultural change.

[28] Yeh and Lawrence (1995) criticized this claim, arguing that the statistical correlation was sensitive to the inclusion of Pakistan as an extreme observation, and more generally, that it was subject to omitted variable bias.

is questionable whether IBM employees would be a representative sample.[29] Moreover, there are questions about whether the statistical work that underlies this characterization of the data is robust and whether this particular characterization of national culture is replicable in other samples.[30] And while Hofstede is more circumspect than McClelland in claiming that cultural attributes determine national economic performance, they share the conception, going all the way back to Weber, of national economies as aggregations of individuals, largely without reference to intermediating institutions. Moreover, the frequent recitation of Quakers and Jains as economic model minorities, starting with Weber and running through Lewis, McClelland, Hofstede, and others, smacks of casual empiricism.

Recent economic literature has in certain respects re-ploughed the same ground, much of it by making use of the World Values Survey data, but with a more informed notion of the role of institutions in intermediating values and affecting outcomes. LaPorta et al. (1997) define Catholicism, Orthodox Christianity, and Islam as "hierarchical" religions (reminiscent of Hofstede's power-distance index), a characterization for which Guiso, Sapienza, and Zingales (2002) find some support in the responses in the World Values Surveys.

Focusing on the issue of "trust," reminiscent of Hofstede's uncertainty-avoidance measure, LaPorta et al. found that "holding per capita income constant, countries with more dominant hierarchical religions have less efficient judiciaries, greater corruption, lower-quality bureaucracies, higher rates of tax evasion, lower rates of participation in civic activities and professional associations, a lower level of importance of large firms in the economy, inferior infrastructures, and higher inflation" (LaPorta et al., 1997, 336–37). They did not find a robust relationship between hierarchy-dominant religions and infant mortality, educational achievement, and growth.

Extending this work using the World Values Survey data, Guiso, Sapienza, and Zingales find that a religious upbringing has a negative impact on trust among Catholics, Muslims, and Hindus. They also find that with the exception of Buddhism, all of the major world religions encourage intolerance if that religion is the dominant one in the country. (Buddhists are also unique, according to Guiso, Sapienza, and Zingales, in that they are the only adherents who do not ascribe poverty to laziness.) Again, it is not hard to see some affinity to Hofstede's distinction between the high uncertainty-avoidance revealed-truth monotheistic religions (Catholicism,

[29] McSweeney (2002) argues that for several reasons the responses elicited in these surveys are unlikely to be representative. Furthermore while the aggregate sample size is large, for some individual countries the sample sizes are small—less than one hundred responses.

[30] On this issue of fragility, see Bond (2002). For examples of replication, see Triandis and Bontempo (1986) and Hoppe (1998) who largely reproduces the complete set of rankings using a sample of 1,500 alumni of the Salzburg Seminar.

Orthodox Christianity, Judaism, and Islam) and the religions of low uncertainty-avoidance cultures. They also find that theology counts: attitudes involving trust and tolerance are significantly different among Catholics raised after the Vatican II reforms of 1962.

In the economic realm, Protestants, Catholics, and Hindus tend to be favorably disposed toward private ownership, while Muslims want significantly less private ownership. Protestants and Hindus alone accept the trade-off of greater income inequality for more growth, Jews and Muslims are opposed, and the results for other religions statistically insignificant.[31] They interpret this finding as a vindication of Weber.

STATISTICAL ANALYSIS

The hypothesis that religious attitudes affect national economic performance is a testable proposition. A standard production function in the neoclassical growth model can be written as $Y=Ae^{\mu t}K^{\alpha}L^{1-\alpha}$ where Y is gross domestic product, K is the stock of human and physical capital, L is unskilled labor, A is a constant reflecting the technological starting point of each society, and μ is the exogenous rate of technological change. As written, the aggregate production function is Cobb-Douglas with a capital (human and physical) share of α. Rewritten in intensive (i.e., per capita) form, the model implies that the growth rate of per capita income will slow over time as the marginal product on capital declines, and that in a cross-section, poorer countries (with lower capital-labor ratios) will tend to grow more quickly than rich countries, conditional on the saving-investment rate.

For some time, economists have been troubled by the fact that the actual growth trajectories of national economies seem to contradict both implications of the model. Romer (1986), Lucas (1988), Robelo (1991), and others launched the endogenous growth literature that sought to explain the first empirical anomaly through various mechanisms that would temper the tendency of declining marginal returns to slow the growth rate of rich economies; Barro (1991), Barro and Sala-i-Martin (1992, 1995), and Mankiw, Romer, and Weil (1992) set off the now vast literature on the determinants of long-run growth across countries and subnational jurisdictions.

[31] Guiso, Sapienza, and Zingales (2002, 31) also claim a variety of other fascinating results: "Judaism has the strongest negative impact on willingness to cheat on taxes, Protestantism second, Catholicism and Hinduism third, and Islam fourth. The rankings are different when it comes to accepting a bribe. The strongest negative impact comes from Buddhism, with Protestants and Muslims next, and Catholics last. Stulz and Williamson (2001) make no distinction between culture and religion at all, simply using religion as a proxy for culture. They obtain the not entirely elucidated result that stock-market development depends on legal tradition (common law or civil law), while debt market and banking development depend on culture proxies (i.e., dominant religion), with creditor rights and enforcement greater in Protestant-dominant societies.

In addition to the accumulation of physical and human capital, attention has focused on indicators of macroeconomic stability, trade openness, political institutions, and geography.[32]

Solow (2001) questioned the role of the many right-hand-side variables that have been included in the long-run growth literature and instead argued for focusing on national differences in the level and growth of total factor productivity or TFP (i.e., $Ae^{\mu t}$) across countries as the left-hand-side variable to be explained. The problem, of course, is that empirical estimates of TFP are themselves derived as the residuals from growth-accounting exercises, and can be very sensitive to assumptions about the underlying aggregate production function (Pack 2001) and the measurement of inputs (Hsieh 2002). Setting aside these operational issues, Solow (2001, 287) argues that nontechnological phenomena including "the security of contracts, the intensity of competition, and the respect for instrumental rationality as a mode of behavior" could have a major impact on resource allocation and hence TFP. Solow also takes issue with the implicit assumption of much of the empirical work, namely that actual measured output is at or near potential, particularly in the case of poor countries, especially monocultural primary producers.[33] If these kinds of countries are included in the empirical analysis, then droughts and pests should be included in the right-hand-side variables.

In this spirit, table 1 reports simple correlations among McClelland's need-to-achieve estimate for 1950; Hofstede's five cultural indicators; the national means of three variables on the intensity of religiosity (whether a respondent was raised religiously, whether the respondent attends religious services weekly, and whether the respondent believes in God) derived from the World Values Survey data; an estimate of TFP growth for 1973–84 by Collins and Bosworth (1996); and real per capita income growth between 1970 and 1990 derived from the Penn World Tables. See the data appendix for further details.

The only significant correlation between economic performance and the noneconomic variables is a negative correlation at the 10 percent level between the population share raised religiously and per capita income growth. McClelland's need-to-achieve variable is generally uncorrelated with any other indicator—the only significant correlation between this variable and any other measure, is a *negative* correlation at the 10 percent level with Hofstede's long-term orientation measure.[34] The religiosity variables are highly correlated with Hofstede's indices in

[32] See Levine and Renelt (1992) as a fine exemplar of this literature. Among the many commentaries, Pack (1994), Durlauf (1996), and Solow (2001) are particularly good.

[33] Kumar and Russell (2002, table 1) suggest that typically countries may be well inside their estimated production possibility frontiers.

[34] Because the sample sizes differ across the variables (ranging from 31 to 86), and the country coverage varies as well, the actual numbers of observations used to calculate these correlations varies substantially from cell to cell, and as a consequence some relatively high correlations may be less statistically significant

some cases. The population share raised religiously is positively correlated with power-distance (a measure of comfort with hierarchy) and uncertainty avoidance (a measure of risk avoidance), and negatively correlated with individualism. Conversely, the share not believing in God is negatively correlated with power-distance and long-term orientation, and positively correlated with individualism. The issue is whether any relationship between religion and economic performance holds once culture and conventional measures of economic fundamentals are taken into account.

Multivariate Analysis

A standard model of economic fundamentals is reported in the first two columns of table 2. The regressors, defined in the appendix, include initial GDP per capita, investment share, government expenditure share, international trade openness, and educational attainment. In addition to these included regressors, a long list of other variables were tried but are not reported in the interest of parsimony. These include life expectancy, urbanization, and macroeconomic variables including measures of inflation and financial development that are highly correlated with the included regressors. Political-institutional variables that were tried included Freedom House and Polity IV project variables. These measures tended to be either statistically insignificant or not available for a substantial sample share (as was the case with the Acemoglu, Johnson, and Robinson (2001) settler death rate instrument for institutional quality), though as Barro (1999) has shown, there may be a nonlinear relationship between religious affiliation and political development, and inter alia, economic performance.[35] Geographic and endowment variables tried included an oil exporter dummy, a dummy for land-locked countries, and national capital latitude and temperature. Again, these did not yield robust results once the core explanatory variables reported in table 2 were included. The basic regressions were then analyzed for simultaneity, especially with regard to the accumulation of human capital and were re-estimated using instrumental variables estimators.[36] The null of equality between the coefficients derived from the OLS and 2SLS regressions could never be rejected. A summary of these nonreported regressions is available on request.

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than lower correlations once differences in sample sizes are taken into account. In particular, the religiosity variables are derived from a country sample that has many states of the former Soviet Union and the former Yugoslavia that are undefined for the economic performance variables.

[35] The one variable that was consistently significant was expropriation risk, but unfortunately the measure is only available for relatively recent sample periods and hence raises basic issues of causality and violating exogeneity.

[36] Some Islamic governments have impeded female education. Lindert (2003) found that the presence of a "dominant Catholic Church" discouraged primary school education enrollment rates in a sample of 24 countries, 1881-1937.

In both regressions 2.1 and 2.2, initial GDP per capita, the starting point indicator, is negative and statistically significant—i.e., the countries exhibit convergence conditional on the other variables. Similarly, the coefficient on the human capital indicator, average years of schooling, is positive and statistically significant in both regressions. One surprise is that trade openness (defined as exports plus imports as a share of GDP) is insignificant in both regressions, presumably reflecting the crudity of this measure.[37]

Cultural and religiosity variables were then added one at a time to regressions 2.1 and 2.2 (i.e., six cultural variables and three religiosity variables added to two specifications for a total of 18 regressions). In no case were the cultural or religiosity variables statistically significant, and in the interest of brevity these regressions are not reported.[38]

Variables on religious affiliation in 1970 were then added to the standard model in regressions 2.3 and 2.4. Seven categories of religious affiliation are distinguished: Catholic, Protestant, Orthodox Christians, Muslims, Jews, Hindus, and Buddhists.[39] The original source provides data at a finer level of disaggregation, but other religions tend to be either extremely small in terms of global membership (e.g., Baha'is), or are so completely concentrated in a single country that they act as a dummy for that country (e.g., Shintoism in Japan), or are themselves heterogeneous catch-all categories (e.g., ethno-religions). These religions, together with atheists and the nonreligious, collectively make up the "other religions" category. They are omitted from the regression (i.e., are absorbed in the constant) and are the standard against which the included major world religions are judged.[40]

The hypothesis that the coefficients on the religious variables are jointly equal to zero can be rejected for both specifications, though in the case of the TFP specification (regression 2.3), none of the individual coefficients are statistically significant. In the regression on per capita growth rates (regression 2.4), the Jewish, Catholic, and Protestant population shares are negatively correlated with per capita income growth, conditional on economic fundamentals. (Differences in the underlying country samples and sample periods may have as much to do with

[37] It would be desirable to develop a measure that controls for such fundamentals as domestic market size and geographic distance from foreign markets, to isolate true variations in openness to trade. See Frankel and Romer (1999) for one such effort.

[38] These results differ from those obtained by Barro and McCleary (2003) who found intensity of belief (though not church attendance) positively associated with national economic performance.

[39] Unfortunately, the original source does not differentiate Muslims by sect, and attempts to find consistent cross-national data in this regard have been unsuccessful.

[40] Another issue is whether it is religious affiliation or the existence of a "dominant" religion (Lindert 2003), the degree of religious fragmentation, or state-supported religion (Barro and McCleary 2003) that is relevant. The issue of state support is particularly problematic, as some countries that formally maintain a state religion appear to be fairly ecumenical in practice (e.g., Malaysia), while others appear to have in effect a state religion, though it is not officially sanctioned.

the differences in the regression 2.3 and 2.4 results as intrinsic differences in the specification of the dependent variables. See the appendix for lists of the country samples.)

Studentized residuals were generated for all observations. Guyana was the only outlier in table 2 with studentized residuals exceeding 2.0 in absolute value in all cases. Among the predominately Muslim countries, there was no pattern to the studentized residuals. There were occasional outliers (e.g., Jordan's values exceeded 2.0 in regressions 2.1 and 2.3; Iran's was less than –2.0 in regression 2.3), but there was no consistent pattern of positive or negative residuals, and most countries lay near the regression line.

As a final step, the religion and cultural variables were combined with the economic fundamentals. Each of the cultural and religiosity variables was added in turn to the regression 2.3 and 2.4 specifications, yielding 18 regressions. Again, in no case were the cultural variables statistically significant.

Long-Term Results

Typically, the national religious affiliation data change slowly as a function of differential birth rates among different groups, in- and out-migration, and conversion, with some notable exceptions: in South Korea, for example, the Christian share rose from less than 1 percent in 1900 to 18 percent in 1970 and 40 percent in 1990. In much of sub-Saharan Africa, Christianity and Islam have made steady in-roads, eroding the ethno-religious share for centuries. In the regressions reported thus far, the sample period was determined by the availability of data. In the case of the TFP regressions, this was determined by the existence of estimates for a considerable sample of countries for 1973–84. For per capita income growth, the sample period 1970–90 was essentially chosen as the optimal trade-off between maximizing the sample period and maximizing the cross-national sample size, especially for heavily Muslim countries for which the data pre-1970 are sparse. Indeed, one of the basic issues is how something as slowly changing as religious affiliation could explain variable national economic performance.[41]

The table 2 regressions were re-estimated for the 1913–98 period using per capita income data on 31 countries from Maddison (2001). Unfortunately, the country sample consists mainly of countries that escaped colonization during the 20th century, and there are no predominately Muslim countries in this sample. In the absence of the conventional macroeconomic variables, the following regressors were assembled: Nobel Prize winners per capita prior to 1913, the Polity IV composite score of democracy and autocracy in 1913, national capital temperature and latitude, the 1900 urbanization rate, the landlocked dummy, and religious affiliation in 1900. Of the

[41] See Easterly and Levine (2001) on the nonpersistence of growth.

nonreligious explanators, only initial GDP per capita, polity, and latitude were ever statistically significant, and only initial per capita income and latitude were robust to changes in specification.

Four specifications are reported in table 3. Initial per capita income is negative and significant at the 1 percent level in all four cases. Latitude is significant once polity or the Nobel Prize winners per capita is excluded. In regressions 3.3 and 3.4, the religious affiliation variables are added. The F-test on their inclusion is significant at the 5 percent level in both cases. The coefficient on Buddhism is significant in both regressions due to the concentration of Buddhists in Japan, China, and Thailand. In regression 3.4, the coefficient on the Jewish share is negative at the 10 percent level, due to Hungary acting as an influential observation; it disappears if Hungary is excluded from the sample. No country had studentized residuals with absolute values exceeding 2.0 in all four specifications, though Hungary did in three of four cases.

IS ISLAM A DRAG ON GROWTH?

Today Muslims are relatively poor, whether the comparison is done to the worldwide mean at either the individual (Bhalla 2002) or national (Kuran 1997) level, and there is a long line of scholarship that ascribes this state of affairs to Islam itself.[42] (Of course there is also a literature that lays the blame at the feet of Western imperialism [cf. Rodinson 1973, Ayubi 1993].) In principle, the existence of uniquely Islamic economic practices or institutions (most prominently the Koranic prohibition on interest) provides the institutional link between religious affiliation and economic performance at the aggregate level.[43] On the basis of their analysis of World Values Survey data, Guiso, Sapienza, and Zingales (2002) characterize Islam as being negatively associated "with attitudes that are conducive to growth" and, among adherents to the world's major religions, Muslims as being the most "antimarket," though these assessments do not appear to be borne out in tables 2 and 3.

Yet if it is adherence to Islam that is driving macroeconomic outcomes, then this is a puzzle: the conventional wisdom is that the Islamic world was more highly developed than Western Europe in the 10th century; that the West had caught up by roughly the 17th or 18th centuries, hence Western Europe was advancing faster than the Islamic world in the interim. This means that Islam is consistent with long periods of both relatively rapid and slow growth. It also

[42] See Said (1978), Kuran (1997), and Nafissi (1998) for discussion. The basic argument is that Islam preaches fatalism which is inimical to growth; of course, the Koran, like other religious texts is open-ended and subject to interpretation, and as Rodinson (1973) and Kuran (1997) point out there are also verses that encourage enrichment.

[43] See Siddiqi (1981) and Kuran (1992) for surveys of Islamic economic institutions and thought. Rodinson (1973) and Kuran (1993, 2003a) argue that in reality, uniquely Islamic economic practices and institutions have minimal impact on resource allocation.

means that whatever the sins of Western imperialists, Islam was developing more slowly than the West during a period of *Islamic* conquest and geographical expansion into Europe.

There are at least three potential explanations—one emphasizing intellectual roots, one sociological, and one institutional. Regarding the first, what is needed is a theological break similar to the Protestant Reformation, which could alter behavior and provide the turning point between long periods of relatively successful and unsuccessful development. Lewis (1982) argues that somewhere between the 9th and 11th centuries, "the gate of ijtihad" (independent reasoning) was closed—meaning that all answers were already available, hence there was no need for inquiry, just follow and obey.[44] Traditional Muslim education systems taught a finite set of information rather than how to "use their own judgment, exercise their critical faculties, and decide things for themselves" (Lewis, 1993, 354)—reminiscent of McClelland's distinction between formalistic and inner-directed religions. In Weber's view, neither Sufism nor Shi'ism, the most prominent departures from the orthodoxy, could provide the basis for a rigorous ascetic critique of the dominant practices a la Protestant Christianity.[45]

With regard to the sociological origins of Islamic performance, Weber, following the writings of 14th century Islamic writer Ibn Khaldun, argued that Muslim societies were founded by nomadic warriors whose bands were characterized by intense group loyalty—once they settled down, however, their descendents succumbed to the vices of the cities and were replaced by another wave of tribesmen of greater social cohesion, an interpretation that oddly echoes McClelland's argument about low achievement motivation among the upper classes of socially immobile, especially slave-holding, societies. Neither the warrior tradition with its plunder ethic nor the sedentarized dynastic bureaucracy could provide the cultural rationale for development through intensive means.

In an institutional analysis complementary to those of Greif and Lal, Kuran (2002) provides an interpretation of how Islamic practices, for example inheritance rules, inhibited the development of commercial institutions comparable to those developed in the West during the Renaissance, and as a consequence disadvantaged Islamic merchants in competition with their Western counterparts. Indeed, Kuran (2002, 2003b) argues that these institutional constraints explain why commerce within the Middle East came to be increasingly dominated by non-

[44] Lewis (1993) expands upon this critique of "the authoritarian character of traditional pedagogy" and its emphasis on rote memorization. Of course, authoritarian pedagogy and rote memorization are not unique to the schools of Islamic countries, as any Japanese or Korean schoolchild could attest. Ayubi (1993) accepts Lewis' interpretation of the closing of the gate of ijtihad but argues that it was reopened in the 19th century by the emergence of Jamal al-Din al-Afghani and his disciples. See also Lal (1998) for discussion.
[45] See Turner (1974), Metcalf (1999), and Peters (1999) for discussions of the superficial similarities between the 19th century Islamic reform movements and the Protestant Reformation.

Muslim religious minorities until the widespread adoption of Western institutions and practices in the 19th century.

All of these lines of argumentation could be used to rationalize the relative economic underperformance of Islamic societies over long periods. As an empirical matter, it is less clear whether Muslim countries have in fact underperformed relative to similarly situated comparators over the past 50 years or so. Data on per capita income is sketchy, but Barlow's (1982) attempt to construct consistent time-series for the 1950–72 period suggests that, if anything, the Islamic countries of the Middle East exhibited slightly more rapid growth than comparable developing countries over this period. TFP estimates by Collins and Bosworth imply that over the 1960–73 period (i.e., before the run-up in oil prices), Islamic countries achieved faster TFP growth rates than did other developing countries, though their TFP growth rate turned negative after 1973 (i.e., after the first oil shock and the possible onset of Dutch disease and other problems). Similarly, while the results reported in tables 2 and 3 do not yield robust results for the relationship between religious affiliation and national economic performance, if anything, the relationship between Islam and growth appears positive.

The first two columns of table 4 report regressions of the standard model, with the Muslim share and a dummy variable for oil exporters added. The coefficient on the Muslim share variable is positive and significant at the 5 percent level in the TFP regression 4.1—a one percentage point increase in the share of the population professing Islam is associated with a 0.02-0.03 percentage point increase in TFP growth. The Muslim share is insignificant in the regression on per capita income growth (4.2), consistent with the result obtained in tables 2 and 3. This result holds even if one uses simultaneous equation estimators to control for any possible negative influence of Islam on human and physical capital accumulation.

Islam, like other religions, is open-ended, subject to interpretation, and widely varying in practice across both the dimensions of time and distance. Much of the argumentation discussed thus far relates to developments in the Middle East, and the category "Muslim" may be too broad to be analytically meaningful (cf. Zubaida 1995). Not all Muslims are alike; in particular, other cultural influences in non-Arab Muslim societies (such as through the Chinese in Southeast Asia or the French in West Africa) may attenuate the impact of Middle Eastern traditions.

To investigate this possibility, the Muslim population share of each country was weighted by dividing by the distance between the national capital and Mecca (i.e., the weighted Muslim share declines with distance).[46] In these regressions, the inverse distance weighted Muslim share

[46] In a future version of this paper, other weighting schemes such as the log distance, distance squared, or the square root of distance will also be tried.

is positive and significant at the 5 percent level in the TFP regression (4.3) and insignificant in the per capita income growth regression (4.4).

Along similar lines what is at issue are characteristics misattributed to Islam that are actually features of Arab culture.[47] Regressions 4.5 and 4.6 report regressions in which the Arab population share is added to the model, and for the sake of completeness, regressions 4.7 and 4.8 report the results with the inverse distance Arab population share. In all four cases, the relevant coefficient is positive and significant at the 10 percent level or better.

An examination of the residuals revealed that once again Guyana was the only outlier. Among the predominately Muslim countries, studentized residuals exceeding 2.0 in absolute value were relatively rare: only Indonesia in regression 4.8 (2.01) and Iran in regressions 4.1 (–2.67) and 4.3 (–3.15). These results provide no support for the notion that Islam is a drag on growth—if anything, the results in table 4 reinforce the notion that the impact of Islam is positive.

ANALYSIS ON SUBNATIONAL DATA

The cross-national results reported thus far are suggestive but are subject to distortion arising from the inability to adequately control for country-specific economic, political, and institutional influences. Many economic phenomena that vary across countries such as differences in inflation rates, trade policies, or judicial practices can be ignored when examining developments within a single country using data on subnational jurisdictions. So the analysis is extended to the single-country level using data from three multi-ethnic societies with substantial Muslim populations—India, Malaysia, and Ghana—with the aim of providing a check on the cross-national results. The countries were selected on the basis of the availability of subnational data and the existence of significant Muslim and non-Muslim populations.

India

India has the world's third largest Muslim population, following Indonesia and Pakistan. The geographic dispersion of this population across 32 Indian states and union territories is shown in figure 1. Table 5 reports regressions of economic and religious affiliation variables on state-level data. In regression 5.1, the dependent variable is TFP growth derived from Fan, Hazell, and

[47] Lal, for example, writes "But there are important instances (post-Ataturk Turkey, modern Egypt, and, most important, major outposts of Islam in Southeast Asia, Malaysia, and Indonesia) that show that it is not Islamic beliefs in themselves that have hindered development but dysfunctional étatism and dirigisme, which, when reversed in the Muslim parts of Southeast Asia, have delivered Promethean intensive growth" (Lal 1998, 66).

Thorat (1999). That source reports TFP estimates for 17 "heavily agricultural" states.[48] The growth rates of TFP were calculated for 1973–83 and 1983–93 and the observations stacked, with a dummy for the first sample period included to allow the intercept to vary.[49] The regressions were estimated with 1971 (1981) values of the initial level of TFP, female literacy rate, state development expenditures per capita, population density, percentage of villages with electricity, road density, a quadratic function of annual rainfall, and a landlocked state dummy.[50] All except the initial level of TFP, female literacy, and state development expenditures per capita were insignificant.[51] The Indian census data break down religious affiliation by Hindu, Muslim, Christian, Sikh, Buddhist, and Jain shares, with other religions (mostly indigenous animistic religions) broken out for the 1981 sample, but not the 1971 sample. (No religion/not reported is the omitted share in the regressions). The results for regression 5.1 show that the hypothesis that the coefficients on the religion variables are jointly equal to zero can be rejected at the 5 percent level, none of the coefficients on individual religious affiliation variables, including the Muslim share, are statistically significant.

In regression 5.2, real per capita income growth in 1981–96 is regressed against the initial income level, female literacy, and the religion variables.[52] In this case, the coefficients on three of the religious-affiliation variables (Buddhist, Jain, and Other) are positive and significant at the 5 percent level, and the coefficients on the religious affiliation variables are jointly significant at the 1 percent level. The coefficient on the Muslim share is again insignificant.[53]

Malaysia

The population of Malaysia consists largely of three ethnic groups: indigenous Malays or bumiputra, Chinese, and Indians, and there is a high correlation between ethnicity and religious

[48] The TFP data is available for Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Jammu and Kashmir, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal. Data on explanatory variables are missing for Jammu and Kashmir and Assam, yielding 15 usable cross-sectional observations and a panel of 30 observations.
[49] A number of sample observations were lost due to missing data for some of the variables.
[50] The female literacy rate fit the data better than did the male literacy rate or the overall literacy rate. Since according to Schultz (1995) there are reasons to believe that female literacy has an especially positive impact on development, the regressions with female literacy are reported.
[51] Future work will also utilize state-level data on caste and so-called scheduled tribes.
[52] The Indian census reports data for 30 states. In regression 5.2, per capita income growth is missing for Lakshadweep, Dadra, and Nagar Haveli. Religious affiliation data is missing for Assam.
[53] The coefficient on the Jain share in particular is quite large—a one percentage point increase in the Jain share of the population would be associated with a 1.49 percentage point increase in the real per capita growth rate. Since Jains only make up 0.5 percent of the population this is probably the wrong increment to consider. Suppose, however, that the Jain population were to double as a percentage of India's population. The results reported in regression 5.2 indicate that this would generate a 0.75 percentage point increase in the per capita growth rate. Perhaps they *are* the model minority.

affiliation (table 6). Islam is the official state religion, though the freedom to practice other religions is guaranteed under the constitution.[54] The distribution of Muslims across 13 Malaysian states and two federal territories is shown in figure 2.

Table 7 reports regressions for real per capita income growth in 1990-2000.[55] In regression 7.1, population density and juvenile delinquency, a proxy for the absence of "law and order," are both statistically significant. The initial income level is not negative and significant (i.e. the Malaysian states do not exhibit convergence). Regression 7.2 reports a regression of ethnicity in 1990 on per capita income growth. None of the coefficients are individually significant, including the coefficient on the bumiputra share, despite the introduction of affirmative action style policies to promote bumiputra economic interests. The ethnicity coefficients are jointly significant at the five percent level. In regression 7.3 that combines the fundamentals with the ethnicity variables, there are only a handful of degrees of freedom, and nothing is significant. There is some evidence that the inclusion of the state of Sabah (one of the two states on Borneo in East Malaysia) exerts a significant influence on the results: if Sabah is excluded from the regression, the coefficients on population density and juvenile delinquency in regression 7.1 become insignificant.

Table 8 reports regressions of religious affiliation on growth. Regression 8.1 reports a regression of religious affiliation in 2000 (the first census for which it was reported on the subnational level) on per capita income growth, relative to an omitted category consisting of tribal/folk religions, other religion, no religion, and unknown religion. The coefficients on the Muslim, Christian, Hindu, and Buddhist shares are negative and statistically significant relative to this excluded category. Regression 8.2 combines the economic fundamentals with the religious affiliation variables. The coefficients on the Muslim and Buddhist shares are again negative and significant, though the interpretation of the religious affiliation results is problematic—logically the pattern of religious affiliation in 2000 cannot cause differences in cross-state growth performance starting at an earlier date (i.e., the right-hand side variables violate exogeneity).

As demonstrated in table 6, there is a high degree of correlation between religion and ethnicity, and the ethnicity data was used to construct instruments for religion by regressing the ethnicity shares in 2000 on religious affiliation in 2000 and then using the estimated regression coefficients and the ethnicity data from 1990 to construct fitted values for the missing 1990

[54] See Jomo (1992) on the possible relationship between Islam and economic development in Malaysia.
[55] The number of observations vary across the regressions due to some missing data—data on ethnicity, juvenile delinquency, and population density are unavailable for the Labuan federal territory; ethnicity data is not available for Sabah.

religion data. These instrumental variable regressions are reported in table 8 as regressions 8.3 and 8.4. None of the variables is statistically significant.

Ghana

Like India and Malaysia, Ghana is a multi-ethnic, multi-religious country with a significant Muslim population. Both Islam and Christianity have made considerable inroads over the last century, with the share of the population to traditional animistic religions falling from approximately 90 percent of the population in 1900 to around 20 percent today. The Muslim population shares across ten regions are shown in figure 3. Anthropological studies summarized in Last (1979) and Kennedy (1988) indicate that conversion to the Abrahamic faiths has sometimes been associated with behavioral changes such as greater entrepreneurship and the establishment of modern business enterprises.

Data on per capita income levels for Ghana's ten regions were constructed from household surveys conducted in 1988, 1992, and 1998.[56] In addition to income, these surveys were used to construct data at the regional level on such attributes as years of schooling, ethnicity, religious affiliation, population density, time spent fetching water and wood, and distance to water source. Monthly data on average and extreme temperatures and precipitation are also available at the regional level through the Ghana Meteorological Services Department. Given environmental differences between coastal southern Ghana and the northern savannah, data on regional capital latitude were collected, and a landlocked regional dummy was constructed.

Calculation of simple correlation coefficients revealed statistically significant positive correlations between regional growth and years of schooling (with female years of schooling slightly more highly correlated with growth than male schooling); latitude; regional variance in rainfall; the Protestant population share; and the population shares of two ethnic groups, the Hausa and the Akan. (The Hausa are almost exclusively Muslim while the Akan are predominately Christian.) Growth was negatively correlated with the animist population share and a catch-all "other" ethnic classification. Regional growth was not statistically significantly correlated with the initial level of per capita income. The infrastructural development indicators (time spent fetching water and wood and distance to water) were highly correlated with the regional level of per capita income but not with regional growth.

These simple correlations are largely borne out by the regressions stacked panel data reported in table 9. Regression 9.1 reports a regression of initial per capita income, average

[56] A survey for 1987 also exists but contains such peculiarities in the responses as to render the data extremely suspect.

female years of schooling, population density, latitude, and religious affiliation on regional per capita income growth. (The infrastructural and meteorological variables were never statistically significant in the regressions and these results are not reported.) Regional income converges, conditional on female schooling, regional population density, and latitude. The coefficient on the Muslim share is positive and significant at the 5 percent level.[57] (The animist share is the omitted category.) The coefficients on Christian population shares are insignificant, regardless of whether the Christians are distinguished by denomination (not reported) or grouped together (9.1).

The population shares of two ethnic groups (one almost entirely Muslim, the other mainly Christian) were positively correlated with regional income growth. The regression is re-estimated in 9.2, with ethnicity replacing religious affiliation. (The "other" ethnicity is the omitted category.) Neither the coefficient on the Hausa nor Akan share is statistically significant, though the coefficient for the Dagbanis, an ethnic group not known for particular commercial acumen, is. The F-test on the joint significance of the ethnic affiliation coefficients cannot reject the hypothesis of no influence.

Taken together, the results from the three country cases tend to reinforce the results obtained from the cross-national analysis: religious affiliation does not appear to have a robust impact on economic performance once conventional economic fundamentals are taken into account. To the extent that any statistically significant results are obtained for the impact of Islam, the effect appears to be positive.

CONCLUSIONS

This paper has investigated the relationship between religion, culture, and economic performance. The theoretical literature is indeterminate. Empirically, accepting the problematic nature of national culture as a concept, statistically at least, there are correlations between religious affiliation, the intensity of religious belief, and indicators of cultural tendencies. However, the national cultural measures have no explanatory power with respect to national economic performance once conventional economic fundamentals are taken into account.

In contrast, in both cross-country and within-country regressions, the null hypothesis that religious affiliation is uncorrelated with performance can frequently be rejected, though the regressions do not yield a robust pattern of coefficients with respect to particular religions.

Some commentators have claimed that Islam is inimical to growth. In general this is not borne out by the econometric analysis either at the cross-country or within-country level.

[57] As in the cross-national case, this result is obtained even if simultaneous equation estimators are used to control for any possible negative impact of Islam on female educational attainment.

Predominately Muslim countries are seldom outliers (either positively or negatively) in the cross-country regressions. In most cases, the coefficient on the Muslim population share is statistically insignificant. With one exception, where it is significant, it is always positive. The only case of a statistically significant negative coefficient is in the sub-national regression for Malaysia. Islam does not appear to be a drag on growth or an anchor on development as alleged. If anything, the opposite appears to be true. If one is concerned about economic performance in predominately Muslim regions or countries, conventional economic analysis may yield greater insight than the sociology of religion.

DATA APPENDIX

The cross-country data on religion have been taken from the *World Christian Encyclopedia* 2nd edition (Barret, Kurian, and Johnson, eds.). Per capita income, government share of GDP, investment share of GDP, and openness data came from the Penn World Tables Mark 6.1. Per capita income growth, government share of GDP, and investment share of GDP are in current international dollars. Initial per capita income is in constant prices (chain series). Education data have been obtained from the Barro-Lee "International Measures of Schooling Years and Schooling Quality" dataset available on the World Bank's website. As noted in the text, the cross-country TFP estimates were originally constructed by Collins and Bosworth (1996) but are actually published in Rodrik (1999).

The data for the power, individualism, uncertainty avoidance, masculinity, and long-term orientation variables have been obtained from Hofstede (2001). Data on achievement was taken from McClelland (1961). Church attendance, belief in god, and religious upbringing data were taken from Guiso, Sapienza, and Zingales (2002). Data on political institutions were found in the Polity IV Project dataset (2000).

Urbanization data were obtained from "World Urbanization Prospects: The 2001 Revision" (United Nations 2002). Temperature and latitude data were taken from www.worldclimate.com and, in some cases for the latter, were estimated by visual inspection of a map. Nobel Prize data was calculated from www.nobel.se.

Distance to Mecca was calculated from each country's capital using latitude and longitude. The Arab share of population is calculated from data in the *World Christian Encyclopedia* 2nd edition, volume 2 (Barret, Kurian and Johnson, eds.).

Long-run cross-country data on per capita GDP were taken from Maddison (2001). Population and religion data for 1900 were taken from the *World Christian Encyclopedia* 2nd edition (Barret, Kurian, and Johnson, eds.). Urbanization data for 1900 were calculated from Chandler and Fox (1974).

Indian data on per capita GDP, population density, female literacy rates, and religion were taken from the *Statistical Abstract of India* (various years). Data on state TFP levels, village electrification, road density, and development expenditures were obtained from "Government Spending, Growth and Poverty," Fan, Hazell, and Thorat (1998). The authors also kindly provided the data on annual rainfall.

Malaysian data on state per capita GDP, population density, religion and ethnicity for 2000 were acquired from the "Population Distribution and Basic Demographic Characteristics" produced by the Department of Statistics, Malaysia. Other data concerning per capita GDP,

school enrollment, juvenile delinquents, population density, and ethnicity were taken from the "General Report on the Population Census" (various years), also produced by the Department of Statistics, Malaysia.

As described in the text, the data for Ghana are derived from the Ghana Living Standards Surveys, with the exception of the meteorological data that were obtained from the Ghana Meteorological Services Department.

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Figure 1 Religious affiliation in India, 1971

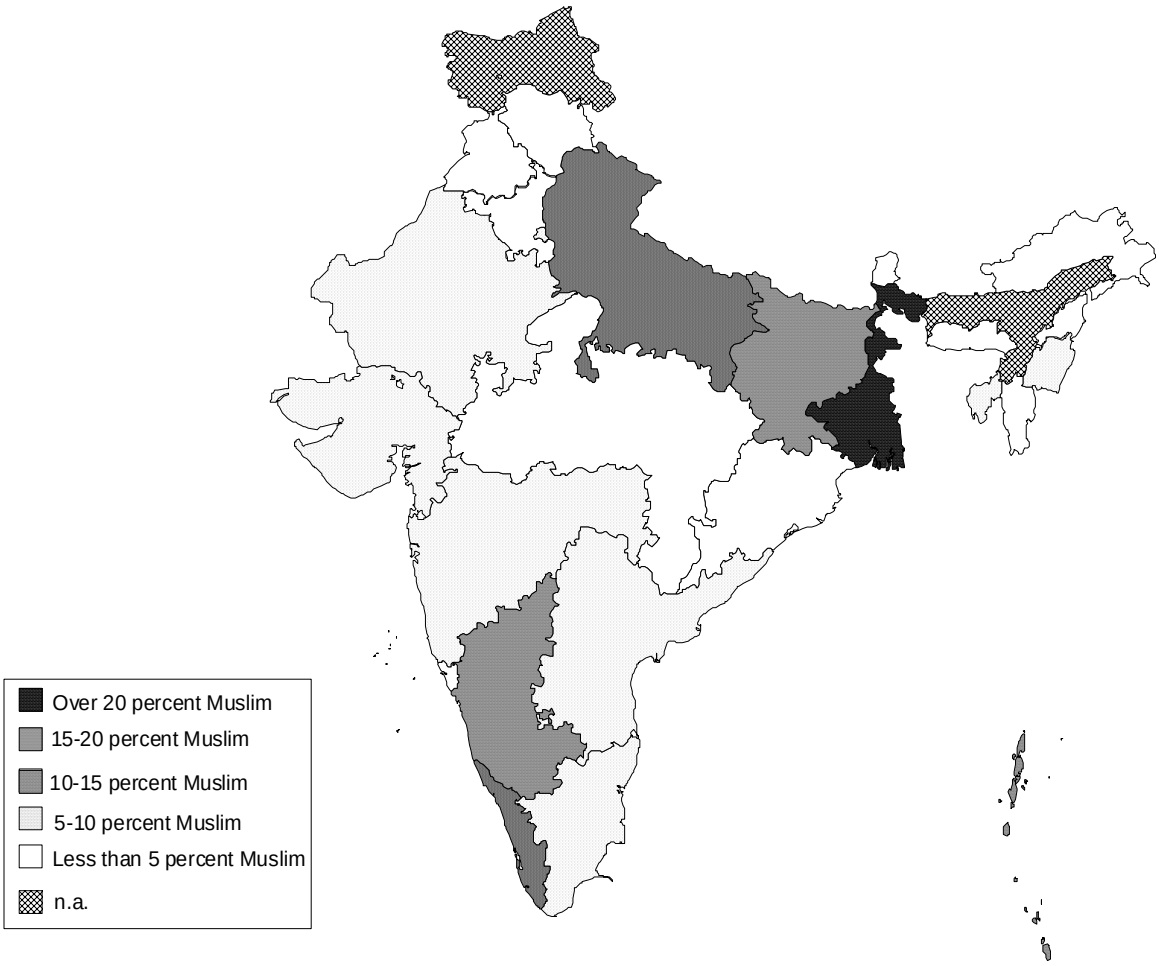

Figure 2 Religious affiliation in Malaysia, 2000

Figure 3 Religious affiliation in Ghana, 1992

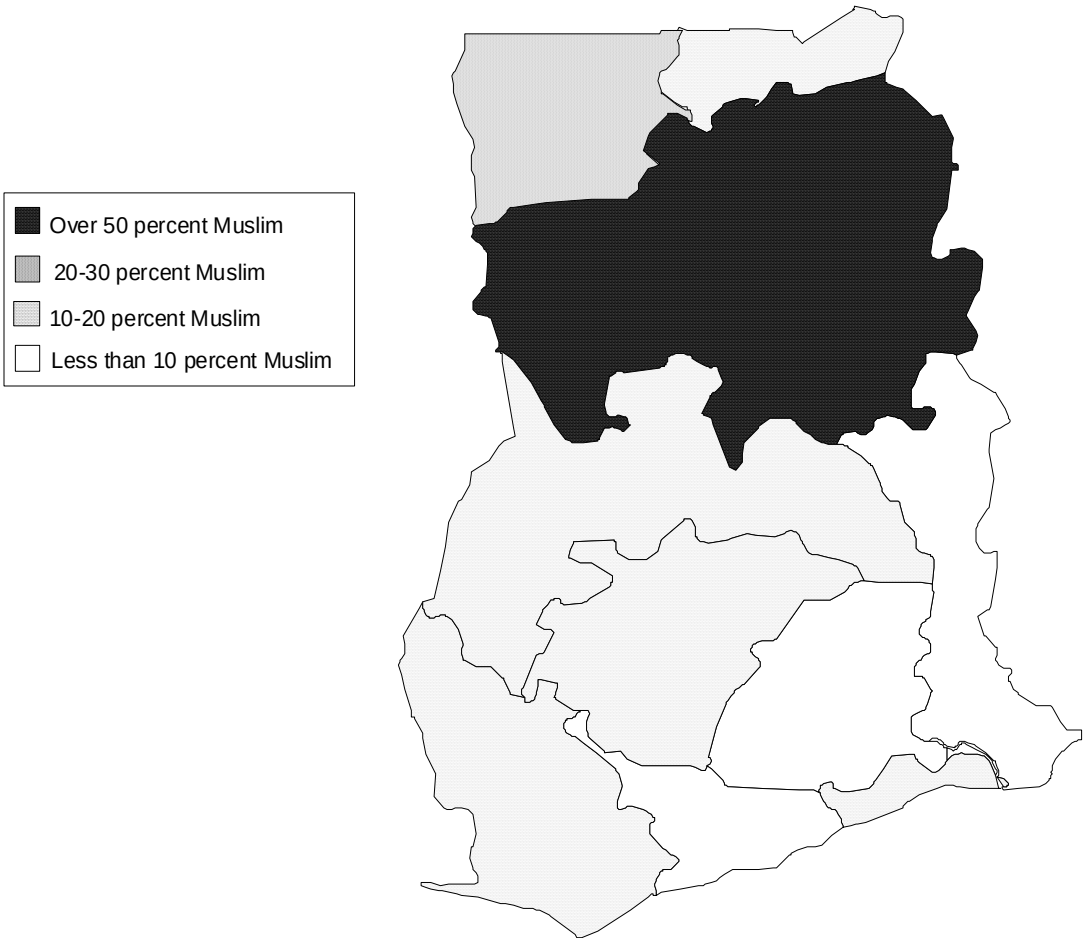

Table 1: Simple Correlations between Economic and Cultural Variables

	TFP, 1973-1984	Per Capita Growth, 1970-1990	Need to Achieve	Power Distance	Uncertainty Avoidance	Individualism-Collectivism	Masculine-Feminine	Long-term Orientation	Raised Religiously	Attends Religious Services at Least Once a Week	Does Not Believe in God
TFP, 1973-1984, n=55	--										
Per Capita GDP Growth 1970-1990, n=86	0.75[a]										
Need to Achieve, circa 1950, n=34	0.35	-0.04	--								
Power Distance Index, circa 1970, n=52	0.07	-0.03	0.05	--							
Uncertainty Avoidance Index, circa 1970, n=52	-0.14	-0.21	0.05	0.20	--						
Individualism-Collectivism Index, circa 1970, n=52	-0.03	0.00	-0.11	-0.66[a]	-0.24[c]	--					
Masculine-Feminine Index, circa 1970, n=52	-0.03	-0.09	0.14	0.18	0.05	-0.01	--				
Long-term Orientation Index, circa 1980, n=33	0.25	0.19	-0.38[c]	0.34[b]	0.13	-0.26	0.13	--			
Raised Religiously, 1981-1997 n=31	0.21	-0.32[c]	0.22	0.47[b]	0.38[b]	-0.57[a]	0.29	-0.23	--		
Attends Religious Services at Least Once a Week, 1981-1997 n=31	0.48	-0.07	0.27	0.31	0.01	-0.25	0.41[b]	-0.10	0.60[a]	--	
Does Not Believe in God, 1981-1997 n=31	0.05	0.28	-0.33	0.40[b]	-0.26	0.53	-0.51	0.03	-0.71[a]	-0.69[a]	--

Note: Superscript a indicates significance at the 1 percent level; b at the 5 percent level; and c at the 10 percent level.

Table 2: Economic and Religious Variables

	Dependent Variables			
	(2.1)	(2.2)	(2.3)	(2.4)
Independent Variables	TFP 73-84	Growth 70-90	TFP 73-84	Growth 70-90
Initial GDP per capita	-0.00049	-0.00033	-0.00044	-0.00025
	(-2.65)[b]	(-3.73)[a]	(-2.32)[b]	(-2.76)[a]
Investment Share	0.0475	0.07761	0.02773	0.07005
	(1.29)	(3.13)[a]	(0.73)	(2.64)[b]
Government share	-0.02437	-0.0223	-0.04991	-0.01898
	(-0.56)	(-0.91)	(-1.06)	(-0.75)
Openness	-0.0098	-0.00468	-0.01267	-0.00442
	(-0.93)	(-0.66)	(-1.24)	(-0.63)
Education	0.57401	0.51306	0.73191	0.63123
	(2.20)[b]	(3.40)[a]	(2.51)[b]	(3.93)[a]
Muslim	-	-	0.00549	-0.00876
			(0.34)	(-0.78)
Hindu	-	-	0.01865	0.00444
			(0.75)	(0.23)
Buddhist	-	-	-0.01031	-0.00901
			(-0.41)	(-0.48)
Jewish	-	-	-0.00469	-0.04356
			(-0.14)	(-1.75)[c]
Catholic	-	-	-0.01817	-0.02722
			(-1.17)	(-2.58)[b]
Orthodox	-	-	0.03472	-0.02276
			(1.33)	(-1.38)
Protestant	-	-	-0.03292	-0.0376
			(-1.29)	(-2.62)[b]
Constant	-0.6336	0.59961	0.61806	1.89688
	(-0.64)	(0.88)	(0.35)	(1.69)[c]
R^2	0.16	0.27	0.40	0.43
F (all explanatory vars)	1.62	5.34[a]	2.10[b]	4.02[a]
F(religion vars only)	-	-	2.21[c]	2.51[b]
n	50	78	50	78

Note: Superscript a indicates significance at the 1 percent level; b at the 5 percent level; and c at the 10 percent level.

Table 3: Long-Run Economic and Religious Variables

	Dependent Variables			
Independent Variables	(3.1) Growth 1913-98	(3.2) Growth 1913-98	(3.3) Growth 1913-98	(3.4) Growth 1913-98
Initial GDP per capita	-0.00023 (-3.03)[a]	-0.00021 (-3.14)[a]	-0.00027 (-3.39)[a]	-0.00025 (-3.72)[a]
Polity	0.01462 (0.72)	-	0.00818 (0.29)	-
Latitude	0.00916 (0.98)	0.0147 (2.13)[b]	0.0171 (1.69)	0.01728 (2.76)[b]
Nobels per capita, 1901-1912	380741.7025 (0.76)	-	-100830.5515 (-0.17)	-
Muslim	-	-	-0.02195 (-0.15)	-0.02489 (-0.18)
Hindu	-	-	-0.79462 (-1.46)	-0.75775 (-1.47)
Buddhist	-	-	0.01641 (1.96)[c]	0.01593 (2.00)[c]
Jewish	-	-	-0.08713 (-0.99)	-0.10036 (-1.72)[c]
Catholic	-	-	0.00703 (0.85)	0.00687 (0.88)
Orthodox	-	-	0.01378 (0.77)	0.01537 (0.98)
Protestant	-	-	0.00892 (1.01)	0.00862 (1.11)
Constant	2.13478 (7.06)[a]	1.96125 (8.36)[a]	1.34812 (1.60)	1.32711 (1.74)[c]
R^2	0.29	0.26	0.65	0.65
F (all explanatory vars)	2.62[c]	5.01[a]	3.22[a]	4.26[a]
F(religion vars only)	-	-	2.82[b]	3.25[b]
n	31	31	31	31

Note: Superscript a indicates significance at the 1 percent level; b at the 5 percent level; and c at the 10 percent level.

Table 4: Muslim and Arab Regressions

	Dependent Variables							
	(4.1)	(4.2)	(4.3)	(4.4)	(4.5)	(4.6)	(4.7)	(4.8)
Independent Variables	TFP 73-84	Growth 70-90	TFP 73-84	Growth 70-90	TFP 73-84	Growth 70-90	TFP 73-84	Growth 70-90
Initial GDP per capita	-0.00054 (-2.86)[a]	-0.00034 (-3.88)[a]	-0.00058 (-3.01)[a]	-0.00034 (-3.88)[a]	-0.00057 (-3.01)[a]	-0.00034 (-3.87)[a]	-0.00057 (-3.08)[a]	-0.00033 (-3.80)[a]
Investment Share	0.03981 (1.11)	0.07575 (3.08)[a]	0.04095 (1.13)	0.07507 (3.04)[a]	0.03607 (1.01)	0.07223 (2.93)[a]	0.03959 (1.13)	0.074 (3.00)[a]
Government share	-0.04349 (-1.00)	-0.02462 (-1.01)	-0.0696 (-1.42)	-0.033 (-1.31)	-0.0755 (-1.59)	-0.03893 (-1.52)	-0.10314 (-2.00)[c]	-0.04211 (-1.58)
Openness	-0.01059 (-1.03)	-0.00366 (-0.52)	-0.01044 (-1.00)	-0.00314 (-0.44)	-0.01037 (-1.02)	-0.0036 (-0.51)	-0.01122 (-1.11)	-0.00352 (-0.50)
Education	0.85184 (2.98)[a]	0.59672 (3.82)[a]	0.85578 (2.92)[a]	0.57647 (3.73)[a]	0.81344 (2.95)[a]	0.56167 (3.71)[a]	0.81726 (3.02)[a]	0.54101 (3.58)[a]
Muslim	0.02224 (2.10)[b]	0.01285 (1.66)	-	-	-	-	-	-
Muslim/Distance	-	-	29.90846 (1.88)[c]	15.1504 (1.52)	-	-	-	-
Arab	-	-	-	-	0.04239 (2.30)[b]	0.0241 (1.88)[c]	-	-
Arab/Distance	-	-	-	-	-	-	48.3926 (2.55)[b]	20.874 (1.74)[c]
Net Oil Exporter	0.21009 (0.25)	0.16311 (0.28)	0.38057 (0.45)	0.21911 (0.38)	0.21006 (0.25)	0.07476 (0.13)	0.52602 (0.65)	0.23152 (0.40)
Constant	-1.21004 (-1.22)	0.14685 (0.20)	-0.58206 (-0.59)	0.41315 (0.60)	-0.22503 (-0.23)	0.66794 (0.97)	0.20015 (0.19)	0.73615 (1.05)
R^2	0.24	0.30	0.23	0.30	0.26	0.31	0.28	0.31
F (all explanatory vars)	1.95[c]	4.37[a]	1.80	4.28[a]	2.10[c]	4.52[a]	2.30[b]	4.42[a]
n	50	78	50	78	50	78	50	78

Note: Superscript a indicates significance at the 1 percent level; b at the 5 percent level; and c at the 10 percent level.

Table 5: Indian Regressions

	Dependent Variables	
	(5.1)	(5.2)
Independent Variables	TFP 73-93	Growth 81-96
Initial TFP Level	-0.05999 (-2.00)[c]	-
Initial GDP per capita	-	-0.00582 (-2.02)[c]
Female Literacy Rate	0.19155 (2.26)[b]	0.08209 (2.17)[b]
Development Expenditures per capita	-0.0859 (-3.50)[a]	-
Decade 73-83 dummy	-2.60826 (-1.73)[c]	-
Hindu Share	0.10566 (0.12)	0.03612 (0.82)
Muslim Share	0.00471 (0.01)	-0.07112 (-0.95)
Christian Share	-0.3539 (-0.40)	0.04189 (0.94)
Sikh Share	0.18992 (0.22)	0.05912 (1.15)
Buddhist Share	0.67502 (0.66)	0.17479 (2.25)[b]
Jain Share	-1.07947 (-1.23)	1.49234 (2.29)[b]
Other Religion Share	-	0.15009 (2.23)[b]
Constant	1.90728 (0.02)	-0.40808 (-0.09)
R^2	0.64	0.65
F (all explanatory vars)	3.41[a]	3.29[b]
F(religion vars only)	3.37[b]	3.68[a]
n	30	26

Note: Superscript a indicates significance at the 1 percent level; b at the 5 percent level; and c at the 10 percent level.

Table 6 Religion and ethnicity correlations, Malaysia

	Bumiputra	Chinese	Indians	Islam	Christian	Hinduism	Buddhism	Confucianism/Taoism
Bumiputra	1							
Chinese	-0.97[a]	1						
Indians	-0.83[a]	0.69[a]	1					
Islam	0.80[a]	-0.85[a]	-0.49[c]	1				
Christian	0.08	0.03	-0.38	-0.51[c]	1			
Hinduism	-0.80[a]	0.66[a]	0.99[a]	-0.46[c]	-0.40	1		
Buddhism	-0.96[a]	0.96[a]	0.77[a]	-0.68[a]	-0.23	0.74[a]	1	
Confucianism/Taoism	-0.75[a]	0.77[a]	0.59[b]	-0.62[b]	-0.12	0.59[b]	0.72[a]	1

Note: Superscript a indicates significance at the 1 percent level; b at the 5 percent level; and c at the 10 percent level.

Table 7 Malaysian regressions on ethnicity

	Dependent variables		
Independent variables	**(7.1) Growth 1990-2000**	**(7.2) Growth 1990-2000**	**(7.3) Growth 1990-2000**
Initial GDP per capita*	0.04404 (0.04)	-	-0.00595 (-0.01)
School enrollment*	3.39833 (0.47)	-	-2.60131 (-0.4)
Juvenile delinquency*	-2.89451 (-2.16)[c]	-	-1.34833 (-1.02)
Population density*	1.1193 (3.78)[a]	-	0.32594 (1.03)
Bumiputra	-	-0.22305 (-0.71)	-0.24833 (-0.39)
Chinese	-	-0.1741 (-0.56)	-0.2121 (-0.33)
Indians	-	-0.20342 (-0.66)	-0.18287 (-0.31)
Constant	-29.00088 (-0.86)	23.72559 (0.77)	30.61908 (0.39)
R^2	0.62	0.61	0.72
F (all explanatory vars)	3.64[b]	4.63[b]	1.83
F (ethnicity vars only)	-	-	1.66
n	14	13	13

Note: Superscript **a** indicates significance at the 1 percent level; **b** at the 5 percent level; and **c** at the 10 percent level.

* Variable specified in natural logs

Table 8 Malaysian regressions on religion

	(8.1)	(8.2)	(8.3) (IV Estimation)	(8.4) (IV Estimation)
Independent variables	Growth 1990-2000	Growth 1990-2000	Growth 1990-2000	Growth 1990-2000
Initial GDP per capita*	-	0.09901 (0.12)	-	0.02382 (0.03)
School enrollment*	-	0.92202 (0.14)	-	2.24213 (0.23)
Juvenile delinquency*	-	-2.68143 (-1.55)	-	0.3039 (0.15)
Population density*	-	1.06262 (1.66)	-	0.02385 (0.06)
Islam	-0.42962 (-3.02)[b]	-0.37528 (-2.25)[c]	-23.03501 (-1.6)	-22.88037 (-0.52)
Christianity	-0.57565 (3.37)[a]	-0.4399 (-2.09)	-0.42122 (-2.61)[b]	-0.48531 (-1.29)
Hinduism	-0.46729 (-2.83)[b]	-0.24363 (-1.05)	38.69487 (1.56)	38.2994 (0.51)
Buddhism	-0.34319 (-2.30)[c]	-0.4243 (-2.25)[c]	-63.8342 (-1.57)	-63.39241 (-0.51)
Confucianism	-0.34973 (-1.57)	-0.19037 (-0.73)	83.12802 (1.53)	82.74259 (0.5)
Constant	44.30398 (3.12)[b]	19.21894 (0.54)	2222.91966 (1.6)	2199.73974 (0.52)
R^2	0.85	0.91	0.84	0.85
F (all explanatory vars)	8.78[a]	4.63[c]	7.49[a]	1.89
F(religion vars only)	8.78[a]	2.69	7.49[a]	1.65
n	14	14	13	13

Note: Superscript **a** indicates significance at the 1 percent level; **b** at the 5 percent level; and **c** at the 10 percent level.

* = Variable specified in natural logs.

Table 9: Ghanaian Regressions of Regional Per Capita Income Growth on Religion and Ethnicity

Independent Variables	(9.1)	(9.2)
Initial GDP per capita	-0.00006 (-9.86)[a]	-0.00008 (-7.37)[a]
Period	-2.27348 (-1.89)[c]	-3.30132 (-2.11)[c]
Female Years of Education	5.05496 (4.06)[a]	7.6208 (3.92)[a]
Latitude	-2.18203 (-2.92)[b]	-1.68668 (-1.12)
Population Density	0.03367 (3.00)[b]	0.06631 (3.34)[b]
Christians	-0.08378 (-0.85)	-
Muslim	0.17148 (2.75)[b]	-
Akan		-0.07675 (-0.83)
Ewe		-0.14017 (-1.62)
Ga/Adangbe		-0.25937 (-1.44)
Dagbani		0.23201 (2.74)[b]
Hausa		-0.95475 (-1.30)
Nzema		0.07377 (0.18)
Constant	31.4018 (3.43)[a]	31.53156 (1.96)[c]
R^2	0.94	0.95
F	8.28[a] (religion)	2.21 (ethnicity)
n	20	20

Note: Superscript a indicates significance at the 1 percent level; b at the 5 percent level; and c at the 10 percent level.